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ABSTRACT

This paper reviews the historical development of programed instruction from the works of S.L. Pressey and B.F. Skinner to the concept of program-assisted instruction. A categorical listing of both the limitations and the capabilities of programed instruction is included. (RL)

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ONCE MORE: PROGRAMMED INSTRUCTION IN THE LANGUAGE FIELD: THE STATE OF THE ART

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A study prepared by me five years ago and published in the Modern Language Journal in 1968,[1] and a book in progress on the field being written with Ralph W. Ewton, Jr. and Theodore H. Mueller, represent the speaker's qualifications to discourse on the present theme. In preparing this brief presentation, the writer was struck by the fact that, as they say in Russian, "A voz i nyne tam," or nothing has changed very much since my last writing. This was further confirmed by a perusal of the new and invaluable Britannica Review of Foreign Language Education, edited by Emma Birkmaier, which yielded a number of references to PI*, discussed with proper caution, and including a statement by Dale I. Lange that:

> The use of programmed instruction in a program of language learning is without doubt extremely useful.. However, as has been indicated by Carroll, Ornstein and others, the profession has not yet determined its use.[2]

This may, however, be more convenient for the speaker in his preparation than it is auspicious for programmed instruction, whose genesis we are discussing here.

Claiming no attributes of prophetic vision, yet almost obsessed by a Germanic type of striving for thoroughness of coverage, the speaker in the MLJ study mentioned above, (by now entered into the ERIC system) simply pulled together the documents attesting to the growth of PI, at least half of them unpublished, and drew various conclusions about the state of the art and made some predictions. Please forgive my immodesty in pointing out that our friends in other sectors of the educational front deemed the survey important enough to be printed in condensed form in the February, 1969, Education Digest.[3] This by way of urging that we not be quite so modest and ingrown about what we write, since the interest in what we are doing in foreign language much more keenly interests our colleagues in other disciplines than was the case a quarter century ago.

At any rate, in the brief time allotted, about all we can do is to cover a few basic points, and to look backward at what PI has been, what it appears to be today, and rush in like a fool where angels fear to tread in trying to make some projections into the future.

First of all, glancing into the past, we must look at two points in educational history. When educational psychologist Sydney L. Pressey, my

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*Heretofore standing for "Programmed Instruction."

undergraduate adviser at Ohio State University, as early as 1915 developed a testing-teaching prototype which came to be known as the "teaching machine," he was a man with an idea which had not yet come of age. Also author of Education and the New Psychology, Pressey was an influential man in educational circles but not influential enough to convince the academic world that his unique ideas of feedback and reinforcement were worth adopting on any widespread scale for teaching purposes. Accordingly his prototype came to rest in the Smithsonian Institution in Washington, and the concept was all but forgotten.

The second point in history occurred in 1957 when Harvard psychologist B. F. Skinner published Verbal Behavior and other writings presenting the revolutionary view, in effect, of a type of instruction where the results gained by students, not the teacher's subjective evaluation of his own effectiveness was the central concern. The basic features of programmed instruction are too well known to all of you to merit time here, and the theoretical aspects of the subject are being handled by our Purdue colleague, Kenneth Chastain. Let us say that quite coincidentally, Skinner as a stimulus-response or behavioral psychologist espoused and still espouses a learning theory that fits in very neatly with the audio-lingual habit theory of language instruction. This fact continues to be of importance, underlying as it does part of the controversy raging within our field as to the respective merits of that doctrine and the cognitive code approach.

In any event, unlike Pressey, Skinner offered his theories to an America more affluent and advanced in technology and innovation-minded than was the case with Pressey. The educational climate was simply ready, after so many agonizing re-appraisals, for still a new approach, and one perhaps based more on hardware than elusive, and semantically troublesome abstract notions so susceptible of varying interpretation and application.

Then came the pioneer period of unbridled enthusiasm both within our field and outside it. Every little development in the programming area was hailed in popular periodicals and even scholarly journals as presaging a breakthrough. Honest programmers actually felt compelled to make public disclaimers that theirs was not a plot to dehumanize instruction or make the human teacher obsolete. The minute details of the development of the courses and experiments attempted during this period of the Brave New World of educational technology are available in the MLJ study and elsewhere.

This was followed by the inevitable post-honeymoon period of disillusionment and stock taking. PI had not really made the magic breakthroughs which had been so breathlessly awaited. We foreign language teachers had not been so relieved of

the tedious aspects of our work, such as performing endless drills and exercises, that many of us could devote most of our time to "creative teaching"--that Nirvana of all academic existences. Government and private foundations once eagerly underwriting PI efforts to the tune of millions, now made a volte-face and left private scholars and their respective institutions to foot their own bills--if they still cared to engage in the often fascinating but always arduous task of developing PI materials and convincing their schools that they were worth using. So it was that the boys were separated from the men, to use a much hackneyed expression, and the second period of development which still prevails is one in which a relatively small group of believers continues, without benefit of quixotic illusions and limitless funds, to labor in the vineyards of programmed learning.

This leads us into the next segment or sequence, to use PI terms. The failures attributed to PI, if examined critically, now look more than anything, like human errors of calculation or disappointments due to unrealistic and inflated expectations. The cold, hard fact is that the applicability of programmed instruction is in direct proportion to the concreteness and specificity of a subject. The more abstract and replete with delicate nuances, the less does the subject lend itself to programming. Despite this, nevertheless, there are in most disciplines specific segments involving factual data, dates and "hard" information, which generally are well suited to this approach.[4] Quite understandably, therefore, while in the academic environment, and especially in the humanities and social sciences, programming has made slow, unsteady progress, often being abandoned after a single trial, programmed instruction courses are proliferating in the Armed Services, Government, and private industry. The DuPont Corporation in Wilmington, Delaware, for example, utilizes over 90 PI courses for employee training.

Aside from the above handicaps, as with any other innovation, extrinsic factors have also played an inhibiting role. These include human lethargy and inertia, high cost and insufficient supply of courses, coupled with difficulties of accomodating PI within existing bureaucratic school structures.

As a result, today in our field it is doubtful that programmed instruction is employed in more than five percent of language programs in academic schools at all levels in our country. Abroad the application is even more microscopic despite significantly growing development in both Western and Eastern Europe. A stimulating upsurge of activity is now seen among our neighbors to the north, and Professor Breton is, fortunately, here to bring us au courant of the Canadian Government's expanding use of PI in their drive for more effective bilingualism.

No special attention is being paid here to computer-assisted instruction, which is nothing more or less than an analog of PI. While open-mindedness must be observed, the fact is that this is a glamour aspect of the field, still largely in the realm of research and development. Hardly any programs are available to ordinary classroom teachers at the present writing. Significant experimentation in Russian teaching has been done by IBM, in connection with the Defense Language Institute, West Coast Branch, Monterey, California, and German with the State University of New York, Stony Brook. Another experiment with Russian has recently been completed at Patrick Suppes' Institute of Mathematical Studies in the Social Sciences at Stanford University, and in French by the University of Illinois Plato project, financed by funds from the state legislature.

In the computer approaches, it should be noted that a branching rather than a linear format is usually followed, with high frequency errors anticipated and students directed to proper review and remedial work by the program. Here, again, the high cost of computer facilities can be amortized, as its advocates argue, through offering courses to large numbers of learners, often in a consortium of geographically adjacent schools.

All this is tantamount to saying that at this beginning of the new decade, PI and all its variants stands squarely outside the mainstream of our educational institutions. Without superfluous breast-beating and wailing, it may safely be said that this marginal status of the art is at least in considerable part due to a lack of critical evaluation both of its limitations and potential by those who would be most concerned--rank and file classroom teachers and hard-headed school administrators.

Which brings us to the next segment. We will attempt here to make an inventory, following PI procedure, of teaching points or lecture points on what we feel PI can do and what it cannot perform. First of all, in the category of limitations, we detail the following:

1) No programming device, be it pen-an pencil or the most sophisticated computer complex, can now or in the predictable future, simulate the human being in his flexible resourcefulness, and providing immediate and creative reinforcement;

2) PI at best provides too artificial a situation for conversational interaction. Enough experimentation has been performed to convince us that learners study for other human beings involved, and not for for machines. The role of reinforcement through correct answers as an incentive has come under severe attack.

3) It is inadequate and impractical for teaching the writing skill, except at the lowest level of completion exercises and the like. The writing

of various types of compositions requires a human teacher, able to deal "on line" with the numerous grammatical, syntactic, and stylistic features.

4) PI is hopelessly ineffective in advanced literature courses because only humans are versatile enough to deal with the entire spectrum of elements, such as discussion of aesthetic values and cultural patterns, even at the relatively low level of foreign language literary offerings.

Having eliminated some of the most important areas of the foreign language field, we must now ask what PI can really do for us teachers. We ask it this way because, except for a minority of practitioners, mostly hard-core adherents of F. Rand Morton, now at the College of Artesia, in New Mexico, the entire emphasis has changed from the more visionary and naïve Halcyon days of the pioneer period when a polarized view was taken in which a class had either a human instructor or a programmed device. Experiments with exclusively programmed teaching courses have in the vast majority of cases, reached the conclusion that this was not the most effective husbanding of resources. By now, most practicioners regard as the most rewarding structure one in which PI assists the teacher in the more grubby and less enjoyable routine operation. Accordingly, PI may be re-written as PAI, or "program-assisted instruction." In a modest way, the approach is at least recognized as one means for coping with individual difference and oversized classes when students have all too few opportunities to react and recite.

For the most part, some sort of human contact is provided, as for example, by Valdman and Mueller--their "display sessions" where students assemble at intervals with instructors to discuss unresolved problems, let off steam, and engage in "spontaneous conversation" to the extent of their linguistic resources.[5]

Turning now to the more positive topic of what can be performed within the framework of PAI, the following list is only suggestive:

1) Provide endless opportunity for drills and exercises outside of class, to strengthen all increments of knowledge, oral and written;

2) Accomplish a great deal of the presentation of grammatical points and lexicon;

3) Furnish much-needed listening practice through tape recorded reading selections and dialogues. Questions-and-answers and other easily correctable exercises can be rapidly prepared for feedback and testing opportunities.

4) Diagnostic and remedial sequences treating thorny problem areas, such as Romance Language subjunctive, German modals, Slavic aspects. A course on Japanese honorifics, recently produced in England, is an example of

the type of thing which is being sorely neglected.

5) Entire language courses in which the total human conversational situation need not be reenacted are entirely feasible. These include reading courses, miniframes alternately presenting reading selections and grammatical points, as well as tourist and limited objective spoken courses, (the Pimsleur series[6] and "mini-courses" developed by the Foreign Service Institute for use by military and civilian personnel in Vietnam and elsewhere are examples.) A movement to replace tape recorders by cassettes promises to make the audio components cheaper and more portable.

6) Virtually limitless types of specialized tests.

7) As adjustive materials building upon existing knowledges, particularly in training programs for bilinguals and individuals with previous knowledge of a language.

No, dear listener, educational technology did not bring about the millenium and create a royal road to language mastery. As such, it joins the phonograph record, the wire-recorder, the tape recorder, the "Army Method" and even the computer, in the parade of inventions that failed in making easy or rapid language learning possible for Americans, who have no lack of Sprachgefühl, but who, as a pragmatic people, grudge the long, hard labor that the acquisition of even an elementary language skill demands. So much for the layman. But for language teachers themselves, impressive projects operated at high cost at large centers, no matter how important for needed research and development, often have little relevance, unless their findings are translated into applied classroom terms. Where does it all lead, particularly if one has no easy access to research funds--and the obtaining of these becomes daily harder?

The only answer, as the speaker sees it, is for us in our field once more to appraise the potential role of PI in ordinary teaching tasks, and to encourage the development of PI materials in those areas where it can assist and strengthen our teaching.

Rather than dreaming of grandiose projects, unlikely either to be funded or to succeed, aimed at showing that the "teaching machine" can both surpass the live teacher and replace him, it is time to think of the auxiliary roles that PAI can play in that complicated and time-consuming labor of foreign language instruction. Perhaps the "credibility gap" created by the over-selling of the approach, can be increasingly overcome as in less dramatic but more concrete ways we assign to PAI those operations of our job, such as additional drill and listening practice, that our schedules simply do not allow us to perform in sufficient depth. And, thanks to the often miraculous workings of "serendipity,"

it is not too wild to assume that potential funders will look with favor upon us once more, and be willing to underwrite efforts showing in actual results that programmed instruction can fill some of the gaps left will-nilly by the classroom situation.

Along this same line, is there a single practicioner in this house that does not believe that programming is as much a state of mind as it is a set of techniques? By way of a private testimonial, after completion of a basic programming course at the Lackland Air Training Command in San Antonio, my own teaching was never the same, for I had been made intensely, even painfully aware of the lack of feedback from students--of that unhappy drifting by them à la derive between the presentation and internalizing of the material. The change is in the direction of constant elicitation from the students of responses showing to what extent they have grasped the points to be learned. Incidentally, S. L. Pressey, now with a half century of experience, holds that it is absurd to try to program everything, "I am not against programming but only against undue fragmentation of subject matter and the rote learning implied by Skinner's theories."[7] In his opinion, the most valuable feature of PI remains the constant feedback component. He has produced, but unfortunately not for our subject, numerous rapid testing devices[8] (available commercially).

Now approaching the conclusion of my peroration, I neither view with excessive alarm nor regard the matter through rose-colored glasses. There is, indeed, a thin but hard line of practicioners both inside and outside Academia whose work simply needs to become better known. In an age of Jules Vernes- like information retrieval, few of us know sufficiently what is going on outside our respective bailiwicks. At Syracuse University James and Margaret Clarke have for years now maintained a dual track for first year German--one conventional, the other programmed.[9] At the Universities of Kentucky and Hawaii, very large segments of the first year course are presented through the Mueller-Niedzielski programmed text, Basic French. Military personnel from over fifty countries receive large doses of programmed English instruction atDefense Language Institute, Lackland Air Force Base, San Antonio, Texas, and most of the language staff receives basic PI training.

Increasingly, one sees the programmed principle used in new textbooks. The very successful English 900 series, prepared by English Language Services and motivated by MacMillan, is used in English as a Second Language classes virtually the world over. A recent ESL text, based on Transformation Grammar analysis, by Earl Rand, titled Constructing Dialogs, employ a semi-programmed format.[10]

I would consider

I would consider my terminal objectives met if I have succeeded in effecting among my listeners a modest change of behaviors in the following direction: that of their avoiding the shibboleths so much bandied about, in global terms of the "dismal failure" or "glowing success" of PI.

My feeling is that the auxiliary roles that PI can fulfill have barely been touched for our field. And finally, I wish to concur vigorously with John B. Carroll who spoke in this very place in 1967, when he protested the narrow view that: ". . .programmed learning must be a very special and narrowly conceived form of instruction requiring a microscopic analysis of the desired behavior and entailing an almost fanatical adherence to their principles of behavior that may be classified under the heading 'operant conditioning'."[11] PI, when all is said and done, is more than all else a vehicle capable of accomodating and serving the most diverse psychological and linguistic theories, be they Lewin's field theory or Chomsky's transformation grammar.

[1]Jacob Ornstein, "Programmed Instruction and Educational Technology in the Language Field: Boon or Failure?" Modern Language Journal 52, (November, 1964), 401-410.

[2]Dale I. Lange, "Methods," in Emma M. Birkmaier, ed., Britannica Review of Foreign Language Education. Chicago: Encyclopedia Britannica, Inc., 1968. 297; see also: the Bela Banathy's essay "Current Trends in College Curriculum: A Systems Approach," 106-39; and James W. Dodge's "Machine-Aided Language Learning," 312-41.

[3]Jacob Ornstein, "Programmed Instruction in the Language Field," Education Digest. (February, 1969)

[4]Technically termed "low," "medium," or "high ideational content" as one goes up the scale of conceptualization. General programmers tend to regard foreign language as an "elusive" subject to program.

[5]See: discussions of "display sessions" in Theodore H. Mueller, ed., Proceedings of the Seminar on Programmed Learning (University of Kentucky Twentieth Foreign Language Conference, Lexington, Kentucky, April 29, 1967) New York: Appleton-Century-Crofts, 1969.

[6]See: Paul Pimsleur. Speak and Read Modern Greek. Pittsburgh, Pennsylvania: American Institutes for Research, 1963; Speak and Read Essential French. Columbus, Ohio: Tapeway, Inc., Box 3014 University Station, 1964; Speak and Read Essential Spanish. Columbus, Ohio: Tapeway, Inc., 1968; cf, by the same author: "Modern Greek Self-Taught: First Step to a National Library," in B. Libbish, ed., Advances in the Teaching of Modern Languages. Voll. II, New York: Pergamon Press, 1966, 138-146.

[7]Personal communication from S. L. Pressey to the writer, September 29, 1967.

[8]S. L. Pressey, "Re-Program Programming?" Psychology in the Schools, IV, No. 3 (July, 1967), 107.

[9]William H. and Margaret G. Clarke, "Achievement in Elementary German Under Programmed Instruction: A Preliminary Study," The Modern Language Journal, 50, No. 2 (February, 1966), 97-100; "Programmed German Faces the Test," National Society for Programmed Instruction (N.S.P.I.) Journal 5, No. 6 (July, 1966), 11-13; and William H. Clarke, "Using Programmed Language Courses in College," in Mueller, ed., Proceedings of the Seminar on Programmed Learning (University of Kentucky Twentieth Foreign Language Conference, Lexington, Kentucky, April 29, 1967) New York: Appleton-Century-Crofts, 1969.

[10]Earl Rand, Constructing Dialogs. New York: Holt, Rinehart, and Winston, 1969. A review of this by the speaker will appear in a forthcoming issue of General Linguistics, published at Pennsylvania State University, University Park, Pennsylvania, 16802.

[11]John B. Carroll, "Psychological Aspects of Programmed Learning in Foreign Languages" in Mueller, ed., Proceedings of the Seminar on Programmed Learning, 63.